NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. COOK UNIT ONE	0 5 0 0 0 3 1 5	1 OF 0 3

TITLE (4)
REACTOR TRIP AND SAFETY INJECTION DUE TO LOSS OF CRID

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 8	1 4	8 4	8 4	0 1 8	0 0	0 9	1 3	8 4		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	Special Report
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
K. R. BAKER, OPERATIONS SUPERINTENDENT	AREA CODE 6 1 6 — 4 6 5 - 5 9 0 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B/D	E F	U J X	S 2 5 0	Y							

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

ON 8-14-84 AT APPROXIMATELY 1520 HOURS, THE UNIT WAS OPERATING AT 100% POWER WHEN THE CRID IV INVERTER ABNORMAL ALARM CAME IN. THE OPERATOR DISPATCHED TO THE SWITCHGEAR ROOM REPORTED WATER ON THE FLOOR OF THE ROOM. A TEMPORARY BLOWER LOCATED ON THE FLOOR WAS BEING USED TO COOL THE INVERTERS AND WAS SPRAYING A FINE MIST INTO THE BACK OF THE INVERTER. AT APPROXIMATELY 1529 HOURS, AS POWER WAS BEING REDUCED, THE CRID INVERTER FAILED RESULTING IN A REACTOR TRIP AND SAFETY INJECTION. THE CRID INVERTER WAS LATER REPLACED AND THE UNIT RESTARTED. A SAFETY INJECTION REPORT IS INCLUDED WITH THIS LER.

AT APPROXIMATELY 1400 HOURS, A SURVEILLANCE WAS BEING PERFORMED ON THE BATTERY ROOM EMERGENCY SHOWER AND EYEWASH STATION. THE TECHNICIAN COULD NOT GET WATER FLOW FROM THE STATION. THE DEMINERALIZED WATER MAKE-UP PLANT WAS OUT OF SERVICE AT THE TIME WHICH RESULTS IN NO WATER PRESSURE FOR THE EYEWASH STATIONS. THE EMERGENCY SHOWER VALVE HAD NOT FULLY SEATED AND WHEN THE HEADER WAS REPRESSURIZED THE VALVE LEAKED CAUSING THE WATER ACCUMULATION ON THE FLOOR WHICH WAS PICKED UP BY THE BLOWER.

A DESIGN CHANGE IS BEING PROCESSED WHICH UPGRADES THE VENTILATION IN THE INVERTER ROOM SO BLOWERS WILL NOT BE NEEDED IN HOT WEATHER. THE SURVEILLANCE PROCEDURE HAS BEEN CHANGED TO REQUIRE DIRECT CONTROL OF AN EYEWASH STATION IF NO FLOW IS OBTAINED DURING A TEST UNTIL THE PROBLEM IS CORRECTED.

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ON 8-14-84 AT APPROXIMATELY 1520 HOURS, THE UNIT WAS OPERATING AT 100% POWER WHEN THE CRID IV INVERTER ABNORMAL ALARM WAS RECEIVED. OPERATORS WERE DISPATCHED TO THE 4KV SWITCHGEAR ROOM TO INVESTIGATE. THEY REPORTED THAT THERE WAS WATER ON THE FLOOR AROUND THE INVERTERS AND A TEMPORARY BLOWER WAS BLOWING A FINE MIST OF WATER ON THE INVERTER. THE BLOWER WAS ON THE FLOOR AND WAS BEING USED TO COOL THE INVERTER BECAUSE OF THE HOT WEATHER. THE OPERATOR REPORTED THE AC OUTPUT VOLTAGE HAD DROPPED TO 92 VOLTS AND A BURNING ODOR WAS SMELLED COMING FROM THE INVERTER. THE OPERATOR REMOVED THE POWER FROM THE TEMPORARY BLOWER.

AT 1529 HOURS, IT WAS DECIDED TO REDUCE POWER TO BELOW THE P-8 PERMISSIVE (50%) IN ORDER TO SWITCH TO THE INVERTER'S ALTERNATE POWER SOURCE WITHOUT TRIPPING THE UNIT. AT ABOUT THE SAME TIME CRID IV FAILED CAUSING A REACTOR TRIP AND A TRAIN A SAFETY INJECTION. THE REACTOR TRIP WAS CAUSED BY A LOW REACTOR COOLANT FLOW SIGNAL IN COINCIDENCE WITH BEING ABOVE THE P-8 PERMISSIVE SETPOINT. THE CAUSE OF THE TRAIN A SAFETY INJECTION WAS LOW STEAMLINE PRESSURE (SIGNAL GIVEN BY LOSS OF CRID IV) CONCURRENT WITH HIGH STEAMLINE FLOW VIA THE STEAM DUMPS. A TRAIN B SAFETY INJECTION DID NOT OCCUR BECAUSE THE TRAIN B OUTPUT RELAYS ARE POWERED FROM CRID IV, SO THEY DID NOT ENERGIZE TO GIVE A SAFETY INJECTION SIGNAL.

THE CRID IV INVERTER WAS SWITCHED OVER TO ITS ALTERNATE POWER SUPPLY AND TRIP RECOVERY PROCEDURES WERE FOLLOWED. THE CRID IV INVERTER WAS DAMAGED BY THE WATER SPRAYED ON IT AND A NEW SPARE INVERTER WAS INSTALLED.

THE CAUSE OF THE OCCURRENCE WAS A LEAKING EMERGENCY SHOWER WHICH IS LOCATED IN AN ADJACENT BATTERY ROOM. EARLIER IN THE AFTERNOON, A SURVEILLANCE WAS BEING PERFORMED ON THE BATTERY ROOM EMERGENCY SHOWER AND EYEWASH STATION. THE TECHNICIAN COULD NOT GET WATER FLOW FROM THE STATION AND REQUESTED ASSISTANCE FROM THE CONTROL ROOM. THE OPERATOR CHECKED THE VALVE LINEUP AND DISCOVERED THAT THE DEMINERALIZED WATER MAKE-UP PLANT WAS OUT OF SERVICE AT THE TIME WHICH RESULTS IN NO WATER PRESSURE FOR THE EMERGENCY SHOWER AND EYEWASH STATIONS IN THE 4KV SWITCHGEAR ROOMS. THE OPERATOR CYCLED THE EMERGENCY SHOWER VALVE AND THEY THEN LEFT THE AREA. AT 1500 HOURS THE MAKE-UP PLANT WAS RETURNED TO SERVICE WHICH PRESSURIZED THE EYEWASH STATION HEADER. THE EMERGENCY SHOWER VALVE HAD NOT FULLY SEATED AND WHEN THE HEADER REPRESSURIZED, THE VALVE LEAKED CAUSING THE WATER ACCUMULATION ON THE FLOOR WHICH WAS PICKED UP BY THE TEMPORARY BLOWER.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

CORRECTIVE ACTIONS INCLUDE A DESIGN CHANGE WHICH IS PRESENTLY BEING PROCESSED WHICH UPGRADES THE VENTILATION IN THE INVERTER ROOM SO THE TEMPORARY BLOWERS WILL NOT BE NEEDED IN HOT WEATHER. THE SURVEILLANCE PROCEDURE HAS BEEN CHANGED TO CHECK THE WATER SUPPLY FUNCTIONAL PRIOR TO PERFORMING ANY TESTING. INSTRUCTIONS HAVE BEEN ADDED TO REQUIRE THE TECHNICIAN TO REMAIN AT THE EYEWASH STATION IF NO FLOW IS EVIDENT DURING THE TEST. THE EMERGENCY SHOWER AND EYEWASH STATION IS TO REMAIN UNDER THE TECHNICIANS DIRECT CONTROL UNTIL FLOW HAS BEEN ESTABLISHED AND THE STATION TESTED AND POSITIVELY VERIFIED TO BE SHUT OFF PRIOR TO THE CONTROLS BEING RELEASED.

A SAFETY INJECTION SPECIAL REPORT IS INCLUDED WITH THIS LER.

ALSO REPORTED DURING THIS EVENT WAS AN EMERGENCY BORATION DUE TO CONTROL BANK C CONTROL ROD N-13 INDICATING 15 STEPS OUT WITH THE ROD BOTTOM LIGHT ON FOLLOWING THE REACTOR TRIP. THE ROD POSITION INDICATION EVENTUALLY DRIFTED DOWN TO INDICATE THE ROD FULLY INSERTED. SUBSEQUENT WITHDRAWAL OF THE CONTROL ROD DID NOT EVIDENCE ANY MECHANICAL BINDING OR OTHER PROBLEMS.

INDIANA AND MICHIGAN ELECTRIC COMPANY
DONALD C. COOK NUCLEAR PLANT

Operating License: DPR-58
Docket No.: 50-315
Special Report: SI-18

SAFETY INJECTION ACTUATION - AUGUST 14, 1984

Conditions prior to Occurrence

The Unit was in Mode 1 operating 100% of rated thermal power. At 1520 hours on 08-14-84 the "Crid IV Inverter Abnormal" alarm was received. Operators were dispatched to the 4 KV switchgear room to investigate. They reported that there was water on the floor around Crid IV Inverter and a temporary blower used for cooling was blowing a fine mist of water on the inverter. The AC output voltage had dropped to 92 volts and a burning odor was smelled coming from the inverter.

Description of Occurrence

At 1529 hours on 08-14-84, it was decided to reduce power. At the same time Crid IV failed, a reactor trip and Train A Safety Injection occurred. The reactor trip was caused by a low reactor coolant flow signal in coincidence with being above the P-8 permisive setpoint (50%). The cause of the Train A Safety Injection was low steamline pressure (signal given by loss of Crid IV) concurrent with high steamline flow via the steam dumps. A Train B Safety Injection did not occur because the Train B output relays are powered by Crid IV, so they did not energize to give a safety injection signal.

Designation of Cause of Occurrence

An eyewash station near the Crid IV inverter leaked water on the floor due to a valve being partially open. The blower used as additional cooling for the inverter picked up this water and blew it onto the inverter. This caused the inverter to fail and subsequently a reactor trip and Train A Safety Injection.

Analysis of Occurrence

The following is a list of major items that were reviewed for their safety implication:

(a) Reactor Coolant System Cooldown

The Reactor Coolant System was at 568°F at the time of the trip and safety injection and a cooldown to 540°F occurred. This cooldown is well within the allowable Technical Specification limit of 100°F in any one hour period.

(b) Thermal Effects of Safety Injection

During this occurrence, the East and West centrifugal charging pumps injected into the Reactor Coolant System through the boron injection lines (1½" nozzles) for a period of six (6) minutes. The maximum flow one charging pump can put through these lines is 470 GPM (T.S. 4.5.2f). The maximum total injection into the RCS for both pumps operation for six (6) minutes is 5640 gallons. The injection of 5640 gallons corresponds to a 19 minute injection of the design base used in FIRL Report F-C4542 which calls for two charging pumps, each having a flow rate of 150 GPM. This is the 18th inadvertant safety injection into the Reactor Coolant System and conservatively constitutes 3.1/10,000 of allowable cycles. This is conservative from the fact that the maximum injection flow required by Technical Specification 4.5.2f is verified at zero RCS pressure. The pressure at the time of the injection was 2235 psig which would have caused a flow less than 470 GPM. The total accumulated cycles to date are 41.2/10,000.

(c) Effects on Emergency Core Cooling System Piping

The piping and supports in the ECCS were given a thorough visual inspection to determine if any mechanical damage was experienced during the safety injection. There was no evidence of any mechanical damage or abnormal movement of the piping.

Corrective Actions

A design change has been initiated and approved which will modify the Crid Inverter Ventilation. This will include the installation of an exhaust fan at the top of the inverter and eliminate the need for temporary blowers.

American Electric Power System
INDIANA & MICHIGAN ELECTRIC COMPANY
DONALD C. COOK NUCLEAR PLANT
P.O. Box 458, Bridgman, Michigan 49106
(616) 465-5901

September 13, 1984

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Operating License DPR-58
Docket No. 50-315

Document Control Manager:

In accordance with the criteria established by 10CFR50.73 entitled Licensee Event Reporting System, the following report/s are being submitted:

RO 84-018-0 and
SI Report SI-18

Sincerely,

W. G. Smith

W.G. Smith, Jr.
Plant Manager

/cbm

Attachment

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